holding said sample;

an evacuating means for evacuating and depressurizing said environment to a pressure condition of 0.5 Pa to 4.0 Pa;

a plasma generating means for forming said etching gas into a plasma under said pressure condition by a high frequency electric power of 10 MHz to 500 MHz; and

a pulse bias applying means for applying a pulse bias voltage to said one of said electrodes mounting said sample;

thus an insulator film in said sample being plasma processed.

18. (Amended) A plasma processing apparatus according to claim 17, which further comprises:

a voltage suppressing means for suppressing a voltage rising generated by applying said pulse bias voltage corresponding to an electrostatic attracting capacity of said electrostatic attracting means;

said voltage suppressing means setting a period of said pulse bias voltage so that voltage change due to an electrostatic attracting film of said electrostatic attracting means during one cycle of pulse is suppressed to one-half of said pulse bias voltage.

23. (Amended) A plasma processing apparatus comprising a vacuum processing chamber, a sample table for mounting a sample to be processed in said vacuum processing chamber, and a plasma generating means, which further comprises:

an electrostatic attracting means for holding said sample onto said sample

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table by electrostatic attracting force;

a bias applying means for applying a bias voltage to said sample;

a radical supplying means having a means decomposing a first gas for generating radicals at a pressure of more than 100 mTorr in advance and for supplying a required amount of the radicals to said vacuum processing chamber;

a means for supplying a second gas which contains at least different molecules than the first gas for generating ions to said vacuum processing chamber; and

a plasma generating means for generating a plasma in said vacuum processing chamber at a pressure of 50 mTorr or less;

wherein SiO2 is used as said sample.

24. (Amended) A plasma processing apparatus comprising a vacuum processing chamber, a sample table for mounting a sample to be processed in said vacuum processing chamber, and a plasma generating means, which further comprises:

an electrostatic attracting means for holding said sample onto said sample table by an electrostatic attracting force;

a pulse bias applying means for applying a pulse bias voltage to said sample;

a radical generating plasma supplying means for forming a first gas for generating radicals at a pressure of more than 100 mTorr into a plasma in advance and for supplying a required amount of the radicals to said vacuum processing chamber; and

said plasma generating means for supplying a second gas which contains at least different molecules than the first gas for generating ions to said vacuum

processing chamber and for generating a plasma in said vacuum processing

chamber at a pressure of 50 mTorr or less;

wherein SiO_2 is used as said sample.

25. (Amended) A plasma processing apparatus comprising a vacuum

processing chamber, a sample table for mounting a sample to be processed in said

vacuum processing chamber, and a plasma generating means including a high

frequency electric power source, which further comprises:

an electrostatic attracting means for holding said sample onto said sample

table by an electrostatic attracting force;

a pulse bias applying means for applying a pulse bias voltage to said sample;

a radical generating plasma supplying means for forming a first gas for

generating radicals at a pressure of more than 100 mTorr into a plasma in advance

and for supplying a required amount of the radicals to said vacuum processing

chamber; and

said plasma generating means for supplying a second gas which contains at

least different molecules than the first gas for generating ions to said vacuum

processing chamber and for generating a plasma in said vacuum processing

chamber at a pressure of 50 mTorr or less;

wherein said high frequency electric power source applyies a high frequency

voltage of 10 MHz to 500 MHz, said vacuum processing chamber being

depressurized to 0.5 to 0.4 pa.

26. (Amended)   A plasma processing apparatus comprising a vacuum

processing chamber, a sample table for mounting a sample to be processed in said

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vacuum processing chamber, and a plasma generating means, which further comprises:

an electrostatic attracting means for holding said sample onto said sample table by an electrostatic attracting force;

a radical generating plasma supplying means for forming a first gas for generating radicals at a pressure of more than 100 mTorr into a plasma in advance and for supplying a required amount of the radicals to said vacuum processing chamber;

said plasma generating means for supplying a second gas which contains at least different molecules than the first gas for generating ions to said vacuum processing chamber and generating a plasma in said vacuum processing chamber at a pressure of 50 mTorr or less;

a pulse bias applying means connected to said sample table and for applying a pulse bias voltage to said sample table; and

a voltage suppressing means for suppressing a voltage rising generated by applying said pulse bias voltage corresponding to an electrostatic attracting capacity of said electrostatic attracting means.

27. (Amended) A plasma processing apparatus comprising a vacuum processing chamber, a sample table for mounting a sample to be processed in said vacuum processing chamber, and a plasma generating means, which further comprises:

an electrostatic attracting means for holding said sample onto said sample table by an electrostatic attracting force;

a radical generating plasma supplying means for forming a first gas for